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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

HAN, JASON

ART UNIT

PAPER NUMBER

2875

DATE MAILED: 10/12/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/726,882	Applicant(s) ARIK ET AL.	
	Examiner Jason M. Han	Art Unit 2875	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 July 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-35 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-35 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 January 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to Claims 1-35 have been considered but are moot in view of the new ground(s) of rejection.

The following claims have been rejected in light of the specification, but rendered the broadest interpretation as construed by the Examiner [MPEP 2111].

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1 and 28-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dry (U.S. Patent 6815724).
3. With regards to Claim 1, Dry discloses an LED light assembly including:
 - A housing [Figures 1-6: (107)];
 - An LED [Figures 1-6: (109)] disposed in the housing;
 - A heat dissipating structure [Figures 1-6: (101)] in thermal communication with the LED; and

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- A fluid current generator [Figures 1-6: (199)] disposed on the housing for creating a current over the heat dissipating structure, wherein the fluid current generator includes a piezoelectric material [Column 3, Lines 54-67].

Dry does not specifically teach the fluid current generator being disposed in the housing.

However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the fluid current generator within the housing, since it has been held that rearranging parts of an invention involves only routine skill in the art. *In re Japiske*, 86 USPQ 70. In this case, placing the generator in the housing would conserve space and provide a more compact device.

4. With regards to Claim 28, Dry discloses the claimed invention as cited above. In addition, Dry teaches a plurality of fins [Figure 7: (205)] extending from the heat dissipating structure.

5. With regards to Claim 29, Dry discloses the claimed invention as cited above. In addition, Dry teaches the fins [Figure 7: (205)] radiating from a central point of the heat dissipating structure.

6. With regards to Claim 30, Dry discloses the claimed invention as cited above. In addition, Dry teaches the fluid current generator [Figure 4: (199)] being positioned adjacent the central point of the heat dissipating structure.

7. Claims 2-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dry (U.S. Patent 6815724) in view of Tanuma et al. (U.S. Patent 5008582).

8. With regards to Claim 2, Dry discloses the claimed invention as cited above, but does not specifically teach the structural details of the fluid current generator including a blade comprising a flexible material, wherein the blade is spaced from a surface of the heat dissipating structure such that an unattached end of the blade can move in relation to the surface.

Tanuma teaches, "In an electric device having a package including-[ed] an electric circuit element therein, a cooling fan is fixed on the package directly. The fan is formed of piezoelectric elements and a flexible cooling fin. The fan generates the cooling air flow due to vibration of the piezoelectric elements [Abstract]." In addition, Tanuma teaches the cooling fan including a blade [Figure 18: (21)] of flexible material, wherein the blade is spaced from a surface [Figure 18: (40)] of a heat dissipating structure [Figure 18: (11, 40, 41)] such that an unattached end of the blade can move in relation to the surface.

It would have been obvious to one ordinarily skilled in the art at the time of invention to modify the LED lamp assembly of Dry to incorporate the fluid current generator/cooling fan of Tanuma in order to ensure conditions [e.g., cooled surface] for efficient illumination of the light emitting diode [see Tanuma: Description of the Prior Art].

9. With regards to Claim 3, Dry in view of Tanuma discloses the claimed invention as cited above. In addition, Tanuma teaches a pedestal [Figure 21: (28)] extending from the surface of the heat dissipating structure [Figure 21: (11, 40)], wherein the blade is attached to the pedestal such that the blade is spaced from the surface [Figure 19].

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10. With regards to Claim 4, Dry in view of Tanuma discloses the claimed invention as cited above. In addition, Tanuma teaches the pedestal having a width at least equal to the width of the blade [Figure 20].

11. With regards to Claim 5, Dry in view of Tanuma discloses the claimed invention as cited above. In addition, Tanuma teaches the pedestal preventing axial current flow between the blade and the surface at an end of the blade that attaches to the pedestal [Figure 18: obvious by disposition].

12. With regards to Claim 6, Dry in view of Tanuma discloses the claimed invention as cited above. In addition, Tanuma teaches a piezoelectric material [Figure 5: (20)] running at least substantially the length of the blade [Figure 5: (19)].

13. With regards to Claim 7, Dry in view of Tanuma discloses the claimed invention as cited above. In addition, Tanuma teaches a plurality of fins [Figure 25: (40)] extending from the surface of a heat dissipating structure [Figure 25: (11)].

14. With regards to Claim 8, Dry in view of Tanuma discloses the claimed invention as cited above. In addition, Tanuma teaches a pedestal [Figure 27: (28)] extending from the surface, wherein the blade mounts to the pedestal.

15. With regards to Claim 9, Dry in view of Tanuma discloses the claimed invention as cited above. In addition, Tanuma teaches the pedestal [Figure 27: (28)] being spaced from the plurality of fins [Figure 27: (40)] to define a gap between the plurality of fins and the pedestal.

16. With regards to Claim 10, Dry in view of Tanuma discloses the claimed invention as cited above. In addition, Tanuma teaches the pedestal preventing axial current flow

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between the blade and the surface at an end of the blade that attaches to the pedestal [Figure 18: obvious by disposition].

17. With regards to Claim 11, Dry in view of Tanuma discloses the claimed invention as cited above. In addition, Tanuma teaches the heat dissipating structure [Figure 25: (11)] including a cavity [Figures 25&27: between (28) and (40)] defining an opening, whereby the cooling fan includes a blade [Figures 25&27: (19)] that covers a portion of the opening.

18. With regards to Claim 12, Dry in view of Tanuma discloses the claimed invention as cited above. In addition, Tanuma teaches the cavity being defined by an end wall that impedes axial current flow [Figures 25&27: (40)].

19. With regards to Claim 13, Dry in view of Tanuma discloses the claimed invention as cited above. In addition, both Dry [Figure 16: (113)] and Tanuma [Description of the Prior Art] teach a heat dissipating structure including a printed circuit board.

20. With regards to Claim 14, Dry in view of Tanuma discloses the claimed invention as cited above. In addition, Tanuma teaches a blade [Figure 25: (19)] having a flexible material [Figure 25: (21)] attached to a piezoelectric material [Figure 25: (20)], wherein the flexible material is substantially the same length as the piezoelectric material.

21. With regards to Claim 15, Dry in view of Tanuma discloses the claimed invention as cited above. In addition, Tanuma teaches the heat dissipating structure including a flow path surface [Figure 27: left side of (28) and (40)] defining the opening and the blade mounting substantially flush with the surface.

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22. With regards to Claim 16, Dry in view of Tanuma discloses the claimed invention as cited above. In addition, it is obvious that due to the disposition of the blade [Figure 27: (21)] and the cavity [Figure 27: between (28) and (40)] that the fluid current generator would produce a vortex shaped current around the flow path surface. It should further be noted that it has been held that the recitation that an element is "adapted to" perform a function is not a positive limitation but only requires the ability to so perform. It does not constitute a limitation in any patentable sense. *In re Hutchison*, 69 USPQ 138.

23. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dry (U.S. Patent 6815724) as applied to Claim 1 above, and further in view of Edelman et al. (U.S. Patent 4501319).

Dry discloses the claimed invention as cited above, but does not specifically teach the structural details of the fluid current generator having two flexible side plates connected together by a flexible hinge.

Edelman discloses a piezoelectric polymer heat exchanger having multiple flexible plates [Figure 3A: (20)] being connected by a rectangular housing/hinge [Figure 3A: (10)]. Though Edelman does not specifically state whether the housing is of a flexible material, the examiner considers the reference functionally equivalent to the limitation in providing support to the plates [Column 3, Lines 46-49]. In addition, it has been held to be within general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In*

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re Leshin, 125 USPQ 416. In this case, a flexible housing/hinge could allow for greater vibration of the multiple plates.

It would have been obvious to one ordinarily skilled in the art at the time of invention to modify the LED lamp assembly of Dry to incorporate the piezoelectric polymer heat exchanger of Edelman in order to provide increased heat transfer efficiency, whereby multiple channels could be provided in venting cold air within and hot air out of the system [see Abstract of Edelman].

24. Claims 18-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dry (U.S. Patent 6815724) in view of Edelman et al. (U.S. Patent 4501319) as applied to Claim 17 above, and further in view of Edelman et al. (U.S. Patent 4406323).

25. With regard to Claims 18-19, Dry in view of Edelman (U.S. Patent 4501319) discloses the claimed invention as cited above, but does not specifically teach the piezoelectric polymer heat exchanger having two layers of piezoelectric material (Claim 18) surrounding a flexible material (Claim 19).

Edelman (U.S. Patent 4406323) teaches a piezoelectric polymer sheet wherein the sheet includes two layers of piezoelectric material [Figure 3: (28, 30)] surrounding a flexible material [Figure 3: (32)].

It is obvious that the latter patent of Edelman (U.S. Patent 4501319) incorporates the teaching of the former (U.S. Patent 4406323). It is also obvious that by surrounding a flexible material with two layers instead of one piezoelectric layer, a greater pressure force may be exerted in creating a stronger fluid current generator. Thus, it would have been obvious to modify the LED lamp assembly of Dry in view of Edelman (U.S. Patent

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4501319) to further incorporate the multiple piezoelectric layers of Edelman (U.S. Patent 4406323).

26. With regards to Claim 20, Dry in view of Edelman (4501319), and further in view of Edelman (4406323) discloses the claimed invention as cited above. In addition, Edelman teaches the piezoelectric polymer sheet in an earlier patent (4406323), wherein the sheet includes two layers of piezoelectric material [Figure 3: (28, 30)] surrounding a flexible material [Figure 3: (32)].

27. With regards to Claim 21, Dry in view of Edelman (4501319), and further in view of Edelman (4406323) discloses the claimed invention as cited above. In addition, Edelman (4501319) teaches the multiple flexible plates having an inner cavity wherein conduits/channels are created in providing heat transfer flow [Figures 3A-3B].

28. With regards to Claim 22, Dry in view of Edelman (4501319), and further in view of Edelman (4406323) discloses the claimed invention as cited above. In addition, Edelman (4501319) teaches a cylindrical/tubular construction type of piezoelectric polymer partitions [Figures 4, 6A-6D], whereby heat transfer flows through an orifice [Figure 4: (48, 50)].

29. With regards to Claim 23, Dry in view of Edelman (4501319), and further in view of Edelman (4406323) discloses the claimed invention as cited above. In addition, Edelman (4501319) teaches first and second orifices [Figures 4, 6A-6D], but does not teach the first orifice tapered. It would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the first orifice being tapered, since it has been held to be within the general skill of a worker that mere change of form

or shape of an invention involves only routine skill in the art. *Span-Deck Inc. c. Fab-Con, Inc.* (CA 8, 1982) 215USPQ 835. In this case, tapering the first orifice could provide a desired fluid flow, such as constriction or narrow output flow, which subsequently speeds the airflow.

30. With regards to Claim 24, Dry in view of Edelman (4501319), and further in view of Edelman (4406323) discloses the claimed invention as cited above, except for the second orifice being tapered in an opposite direction to the taper of the first orifice. It would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the second orifice being tapered in an opposite direction than the first, since it has been held to be within the general skill of a worker that mere change of form or shape of an invention involves only routine skill in the art. *Span-Deck Inc. c. Fab-Con, Inc.* (CA 8, 1982) 215USPQ 835. In this case, tapering the second orifice could provide a desired fluid flow.

31. With regards to Claim 25, Dry in view of Edelman (4501319), and further in view of Edelman (4406323) discloses the claimed invention as cited above. In addition, Dry teaches the heat dissipating structure including a die [Figure 6: (105)] for the LED.

32. Claims 26-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dry (U.S. Patent 6815724) as applied to Claim 1 above, and further in view of Edelman et al. (U.S. Patent 4501319).

33. With regards to Claim 26, Dry discloses the claimed invention as cited above, but does not specifically teach the structural details of the fluid current generator having a first current generator body and a second current generator body, wherein each of the

current generator bodies includes a first flexible side plate and a second flexible side plate connected by a flexible hinge.

Edelman discloses a piezoelectric polymer heat exchanger having multiple flexible plates [Figure 3A: (20)] being connected by a rectangular housing/hinge [Figure 3A: (10)]. Though Edelman does not specifically state whether the housing is of a flexible material, the examiner considers the reference functionally equivalent to the limitation in providing support to the plates [Column 3, Lines 46-49]. In addition, it has been held to be within general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416. In this case, a flexible housing/hinge could allow for greater vibration of the multiple plates.

It would have been obvious to one ordinarily skilled in the art at the time of invention to modify the LED lamp assembly of Dry to incorporate the piezoelectric polymer heat exchanger of Edelman in order to provide increased heat transfer efficiency, whereby multiple channels could be provided in venting cold air within and hot air out of the system [see Abstract of Edelman].

34. With regards to Claim 27, Dry in view of Edelman discloses the claimed invention as cited above. In addition, Edelman teaches the multiple flexible plates having multiple inner cavities wherein a discharge conduit is created in providing heat transfer flow [Figures 3A-3B].

35. Claims 31-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dry (U.S. Patent 6815724) as applied to Claim 28 above, and further in view of Edelman et al. (U.S. Patent 4501319).

36. With regards to Claim 31, Dry discloses the claimed invention as cited above, but does not specifically teach the structural details of the fluid current generator including a plurality of openings for creating a plurality of fluid currents.

Edelman discloses a piezoelectric polymer heat exchanger having multiple flexible plates [Figure 3A: (20)] being connected by a rectangular housing/hinge [Figure 3A: (10)]. In addition, Edelman teaches a fluid current generator with a plurality of openings [Figures 3A-3B].

It would have been obvious to one ordinarily skilled in the art at the time of invention to modify the LED lamp assembly of Dry to incorporate the plurality of openings for creating a plurality of fluid currents, as taught by Edelman, so as to alter the fluid dynamics and provide greater control via multiple currents in cooling the assembly.

37. With regards to Claim 32, Dry in view of Edelman discloses the claimed invention as cited above. In addition, Edelman teaches a fluid current generator [Figures 3A-3B] including a first plate, a second plate, and a flexible hinge/housing (as cited above) attaching the first and second plates, wherein the flexible hinge includes a plurality of openings.

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38. Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dry (U.S. Patent 6815724) as applied to Claim 1 above, and further in view of Edelman et al. (U.S. Patent 4501319).

Dry discloses the claimed invention as cited above, but does not specifically teach the structural details of the fluid current generator including a first plate, a second plate, and a third plate, whereby the first plate is attached to the second plate by a first flexible hinge, the second plate is attached to the third plate by a second flexible hinge, and the first flexible hinge includes an opening facing a first direction and the second flexible hinge includes an opening facing a second direction.

Edelman teaches a piezoelectric polymer heat exchanger having multiple flexible plates attached via hinges [Figures 1: (16,18); 3A-3B: (10)], creating a plurality of openings defined for current flow in different/opposite directions [Figures 3A-3B].

It would have been obvious to one ordinarily skilled in the art at the time of invention to modify the LED lamp assembly of Dry to incorporate the plurality of openings for creating a plurality of fluid currents, as taught by Edelman, so as to alter the fluid dynamics and provide greater control via multiple currents in cooling the assembly.

39. Claims 34-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dry (U.S. Patent 6815724) in view of Glezer et al. (U.S. Patent 6588497).

Dry discloses an LED light assembly including:

- A housing [Figures 1-6: (107)];
- An LED [Figures 1-6: (109)] disposed in the housing;

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- A heat dissipating structure [Figures 1-6: (101)] in thermal communication with the LED; and
- A fluid current generator [Figures 1-6: (199)] disposed on the housing for creating a current over the heat dissipating structure and LED, wherein the fluid current generator includes a piezoelectric material [Column 3, Lines 54-67].

Dry does not specifically teach the structural details of the fluid current generator being a synthetic jet actuator disposed in the housing.

Glezer teaches a thermal management system utilizing a synthetic jet actuator for cooling the system [Abstract].

It would have been obvious to one ordinarily skilled in the art at the time of invention to modify the LED lamp assembly of Dry to incorporate the synthetic jet actuator of Glezer in order to provide a cooling means for the lamp without the use of a fan. To quote Glezer, "Traditionally, the need for cooling microelectronic devices has been met by using forced convective cooling with or without heat sink devices. Forced convection is effected using fans which provide either global overall cooling or locally-based cooling... Use of a fan also requires relatively large moving parts in order to have any success in cooling a heated body or microelectric component. These large moving parts naturally require high power inputs [Column 1, Lines 39-49]."

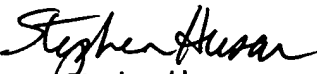
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason M. Han whose telephone number is (571) 272-2207. The examiner can normally be reached on 8:00am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sandra O'Shea can be reached on (571) 272-2378. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JMH (10/6/2005)


Stephen Husar
Primary Examiner